MITIGATION PROGRAM
FOR
DEVELOPMENT IMPACTS ON TRANSPORTATION
IN
SOUTH LAKE UNION

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INTRODUCTION TO MITIGATION

MITIGATION DEFINED

For the purpose of this report, "mitigation" is a one-time obligation by new development and redevelopment[1] to provide capital improvements or programmatic alternatives to the transportation system, or to pay governments for the capital cost of public facilities or transportation programs that are needed to serve new development and the people who occupy or use the new development.

Throughout this report, the term "developer" is used as a shorthand expression to describe anyone who may be obligated to provide mitigation, including builders, owners or developers.

PURPOSE OF MITIGATION

Development usually creates impacts on transportation. The direct impacts typically take the form of increased use of transportation systems and programs, including roads, transit, bicycle, pedestrian, parking and ride sharing. The increased use of one or more of these modes of travel consumes valuable resources, and some modes become so congested as to be less effective and efficient for moving people, freight and goods. Less direct impacts can include decreased safety for travelers, and increased air pollution for the community as a whole.

Development has always created impacts on transportation, but communities accepted such impacts until late in the 20th century. Until that time, communities underwrote the cost of transportation infrastructure in order to promote growth. Since the 1970s, communities have increasingly questioned the value of unmitigated impacts of growth, and many have developed mitigation programs to require development to offset some or all of its impacts on transportation.

[1] Throughout this study the term "new development" will include redevelopment.

REASONS THAT GOVERNMENTS REQUIRE MITIGATION

Local governments typically require mitigation for one or both of the following reasons:

- to obtain transportation facilities or revenue to pay for some of the cost of transportation facilities that serve new development; and/or
- to implement a public policy that new development should pay a portion of the cost of transportation facilities that it requires, and that existing development should not pay all of the cost of such facilities.

SEATTLE'S APPROACH TO MITIGATION

The City of Seattle presently uses Washington's State Environmental Policy Act (SEPA) and its general police power authority to address transportation impacts from new development. The state has authorized several other methods of mitigation, including the Growth Management Act, the Local Transportation Act, Transportation Benefit Districts.

The City's recently completed South Lake Union Transportation Study provides an opportunity to review the City's mitigation program, and to consider ways to improve it. This report describes a new mitigation program that can be used by the City of Seattle to provide a more effective and efficient method to reduce or eliminate the transportation impacts of new development. The new mitigation program is designed as a pilot project for the South Lake Union area. If the mitigation program is successful, it may be used in other areas of the City.

GUIDING PRINCIPLES FOR SEATTLE'S NEW MITIGATION PROGRAM

The proposed mitigation program follows guiding principles developed by the consultant team and senior staff of the City, consistent with City land use and transportation policies. These principles call for improvements that are multi-modal, targeted geographically, and based on a long-term plan for transportation improvements. Each guiding principle is described below.

Multi-modal

The mitigation program covers all the significant mode choices,

including road segments, intersections, and related improvements that support vehicles, including transit vehicles, transit, bicycle, and pedestrian facilities.

Targeted Geographically

The mitigation program is designed specifically for the South Lake Union area. This area is the pilot project for a mitigation program that can be applied to other parts of the City.

In theory, the pilot mitigation program could be applied to development that occurs outside the pilot area, as long as there are impacts in the pilot area. The pilot mitigation program would have to be modified to include "external development impacts" in determining the amount of mitigation. Conversely, if mitigation is not required by development that is external to the pilot area, the City's overall financial plan for transportation improvements in the pilot area will need to provide other funding sources to pay for the portion that would have been mitigated by external development.

There are advantages and disadvantages to expanding geographic area of the pilot mitigation program. On the positive side, more development that impacts the South Lake Union transportation network would be required to mitigate its impact, and the City could collect more mitigation fee revenue to help pay for the projects in South Lake Union. On the negative side, the development in other parts of the City would be paying to mitigate its impact in South Lake Union, but the development would not be paying to mitigate its impact in its own neighborhood with its own neighborhood-wide transportation study. Furthermore, no other development would be paying to mitigate its impact in a systematic way in any areas outside South Lake Union.

Initially, development that occurs in the pilot area is only required to mitigate impacts they create in the pilot area. When additional mitigation program areas are created in the future, development in the pilot area subsequent to that time can be required to mitigate its impacts in other areas, pursuant to the new approach.

Long-term Improvements Plan

The basis for mitigation in the pilot area(s) is a 20-year list of transportation improvements for each mode of travel. A list of

improvements is an effective way of demonstrating the need for, cost of, and ultimate use of mitigation payments.

The list of improvements is the basis for calculating the amount of mitigation needed to reduce or eliminate the impacts of growth in the area. The mitigation program includes flexibility that allows the City to pool early mitigation payments in order to complete the highest priority projects first. Another flexible feature allows the lists to be revised every 1-3 years to respond to changing needs. Yet another feature is a financing plan that ensures that the portion of project costs that are attributable to existing deficiencies, rather than growth, are funded with resources other than mitigations.

The need for improvements is determined by qualitative eligibility criteria used to identify, evaluate and prioritize transportation improvements that are the basis for mitigation.

Maximize Mitigation while Minimizing Undesirable Outcomes

The mitigation program identifies the maximum mitigation that is defensible under the laws used to develop it. Some form of credit or other offset can be given for trip reduction by development.

To the extent that the City has discretionary revenues that could be used for a variety of transportation improvements, those revenues will be directed first to existing deficiencies, and impacts from development outside the mitigation pilot area that are not liable for mitigation. Any remaining discretionary revenue can be applied to offsetting mitigation requirements from development.

MITIGATION FEE FORMULA

Mitigation fees are determined by using a formula. The basic formula has two variables: cost per trip and number of trips. The formula is:

Cost per trip x number of trips = mitigation fee

For example, if the cost per trip is $1,100, and a 50,000 square foot office building generates 90 trips during the peak hour, the mitigation fee would be $99,000.

COMPONENTS OF SEATTLE'S MITIGATION PROGRAM

The pilot mitigation program is based on eight components. The first six components produce the cost per trip for the formula. The seventh component addresses the number of trips. The eighth component produces the mitigation fee. This report includes a rate schedule of mitigation fees per square foot (or comparable unit of development) so that the developer can calculate their mitigation fee by simply multiplying the size of their proposed development times the amounts in the rate study.

Each component is developed for each mode of travel (traffic, transit, bicycle, and pedestrian). The eight components are:

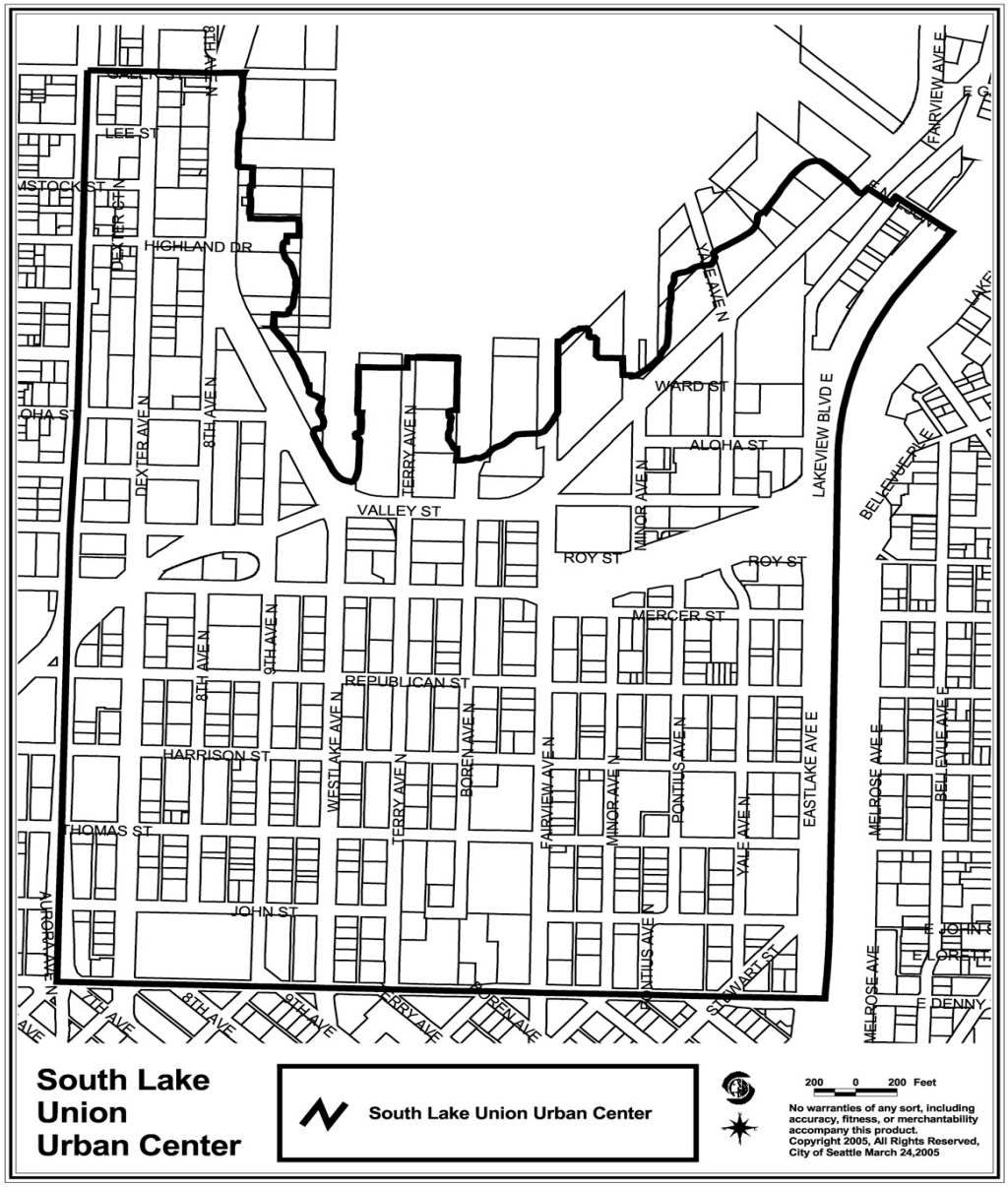
1. Planned improvements to the transportation system.
2. Allocation of project costs between existing deficiencies and future growth.
3. Reduction of costs to account for other committed funding sources.
4. Identification of travel that originates in, or is destined to South Lake Union.
5. Quantification of increase in trips in South Lake Union.
6. Calculation of the cost per trip.
7. Quantification of trip generation rates by different types of development.
8. Calculation of mitigation fee amounts for different types of development.

This report presents each component, and describes the data, assumptions and methodology used to calculate each component that is the basis for the mitigation program fees.

1. GROWTH'S SHARE OF TRANSPORTATION SYSTEM IMPROVEMENTS

The first step in the pilot mitigation program for South Lake Union is to identify transportation improvements that will mitigate the impacts of new development on each mode of travel in South Lake Union, and to determine the portion of the cost of those projects that are attributable to growth. Figure 1 is a map of South Lake Union.

Figure 1: South Lake Union



This chapter describes the source of the list of transportation improvement projects, how transportation improvements were determined to be eligible for the mitigation program, and the allocation of project costs between existing deficiencies and growth.

TRANSPORTATION IMPROVEMENT PROJECTS

The pilot mitigation program for South Lake Union is based on 20-year lists of transportation improvements that will mitigate the impacts of development on each mode of travel in the South Lake Union. The South Lake Union Transportation Study[2] contains the details and the rationale for each project.

ELIGIBILITY OF PROJECTS FOR MITIGATION PROGRAM

Local governments have flexibility in selecting the method they will use to determine the eligibility of transportation projects to be included in their mitigation program. Some local governments determine the eligibility by using quantitative analysis, such as ratios of traffic volume to the design capacity of roads. Other local governments use qualitative criteria to determine the eligibility of transportation projects for mitigation.

Quantitative analysis of eligibility of auto traffic projects gives the appearance of more precision than qualitative analysis, but at a cost of inflexibility and loss of nuance in addressing local congestion. It is difficult to perform quantitative analysis of transit, bicycle and pedestrian because there are relatively few metrics that have been tested, and fewer still in widespread use. As a result, this study uses a qualitative approach to identifying transportation projects that are eligible to be included in the mitigation program.

This study uses an approach to identifying transportation projects that are eligible to be included in the mitigation program based on the ability to provide for a variety of modes of travel that serve the demands of new development in the area. The criteria were applied to the improvement projects to evaluate whether they are necessary to support the development projected in the area. The improvements mitigate the collective impacts of the individual development projects that together are incorporated in the transportation modeling

[2] The study can be obtained from the City of Seattle's Department of Transportation, or the City's web site: www.seattle.gov/transportation/southlakeunion.htm.

conducted as part of this study.

The criteria identify transportation improvements that:

1. Add capacity to the transportation system in the area;

2. Provide for better mobility; or

3. Reduce congestion.

Examples of qualifying projects are those that result in: improved roadway connections; improved transit service; increased travel demand in non-single occupant vehicle modes of travel; improved or maintained travel times; and improved or maintained average vehicle delay.

Projects that satisfy one or more of these criteria are considered to have the ability to reduce or eliminate the transportation impacts that would otherwise result from new development-related travel demand.

After the project team identified projects in the South Lake Union Transportation Study that met these criteria, the City arranged for a third-party review by several individuals who are familiar with transportation planning, traffic engineering, mitigation of development impacts on transportation facilities, and the South Lake Union area. The result of the third-party review did not remove any projects from the City's list. Tables 1-4 list the all of the projects that are eligible for the mitigation program based on the criteria described above.

MODAL COSTS OF TRANSPORTATION IMPROVEMENT PROJECTS

The mitigation program includes improvements for multiple modes of travel, including auto/truck ("traffic"), bicycle, pedestrian, and transit. The costs were prepared as part of the South Lake Union Transportation Study.

ALLOCATION OF PROJECT COSTS BETWEEN EXISTING DEFICIENCIES AND FUTURE GROWTH.

By law, new development can be required to mitigate the impacts it creates on the transportation system, but it cannot be required to mitigate deficiencies that exist before the new development occurs.

Each mode of travel has a different basis for determining the existence and amount of existing deficiencies. The following sections identify and quantify existing deficiencies in each mode, calculate the costs of the deficiencies, and allocate the remaining cost to future growth.

Traffic Deficiencies

Existing deficiencies in traffic (streets, intersections and traffic signals) are determined by two factors:

- the percentage of vehicle miles of travel that travels more slowly than the benchmark travel speed for key travel corridors, and
- the estimated travel speed compared to the benchmark speed.

Nine corridors were analyzed to determine the actual travel speed compared to the benchmark travel speed for the type of street. The nine corridors include:

- Westbound – Fairview/Valley Street/Broad Street/5th Avenue
- Eastbound – Mercer Street
- Westbound – Fairview/Valley Street/Broad Street/Denny Street
- Eastbound – Denny/Broad Street/Mercer Street
- Southbound – Fairview Ave
- Northbound – Westlake Ave
- Southbound – 9th Ave
- Northbound – Dexter Ave
- Southbound – Dexter Ave

Originally, sixteen corridors were selected for the analysis of traffic deficiencies, but seven were eliminated: four because they are too similar to other corridors, and three because they are too short, and therefore not representative of traffic in and through South Lake Union.

The benchmark travel speeds were selected to correspond to level of service "E" on urban streets. Urban Class III streets have a benchmark speed of 10 miles per hour for level of service "E" and

Urban Class IV streets have a benchmark speed of 7 miles per hour for level of service "E."[3]

A travel time survey was conducted by the consultant retained by the City for the South Lake Union Transportation Study. The survey consisted of driving vehicles repeatedly during the PM peak hour in 2003. The actual travel times were obtained according to the instructions provided in Highway Capacity Manual 2000. The actual driving distances and travel times from the survey were used to calculate the average speeds.

Each corridor for which the actual travel speed was slower than the benchmark speed is considered to have an existing deficiency because traffic cannot maintain the speed necessary to achieve the desired level of service. The more substantial the shortfall of the actual speed from the benchmark speed, the greater the deficiency.

The average traffic volume for each corridor was multiplied times the length (in miles) of the corridor. The result is the vehicle miles traveled on that corridor. The total of the vehicle miles traveled on all nine corridors is the sample that represents all vehicle miles in South Lake Union. These vehicle miles are weighted by the extent to which the actual travel speed departs from the benchmark speed.

The total vehicle miles on the three corridors that had deficient travel speeds represent the portion of the sample that is presently deficient. Deficient vehicle miles were weighted to account for the severity of deficiency by multiplying the vehicle miles by the difference in actual travel speed compared to benchmark speed. This total deficiency was compared to all the corridor vehicle miles (deficient and non-deficient) weighted by the difference in actual travel speed compared to benchmark speed.

The total deficient vehicle miles for east/west and north/south travel paths were considered separately. The total weighted deficient vehicle miles in each of the two travel path subgroups are divided by the total

[3] The level of service benchmarks used in the traffic deficiency analysis are consistent with those used by the City for concurrency, but the use of travel speed in corridors is different from the concurrency method. The level of service is applied using the methodology described in Highway Capacity 2000, Urban Street Street (Chapter 15). The LOS definition is provided in Exhibit 16-2. The City's concurrency standard is defined by volume to capacity ratios at designated screenlines in the City's Transportation Element. The LOS E benchmark used in the report is an interpretation of the City's adopted volume to capacity standard where high levels of traffic congestion is accepted.

weighted vehicle miles in those subgroups to calculate the percent of existing deficiency. The analysis summarized in Appendix A shows the existing deficiency is: 77% for the east/west travel paths, and 14% for the north/south paths.

For the purpose of this mitigation program, the appropriate percentage of the cost of all improvement projects for the traffic mode will be allocated to existing deficiencies (which cannot be paid by mitigation), and the remaining costs will be allocated to growth.

Bicycle Deficiencies

Existing deficiencies in bicycle facilities are best determined by the percentage of lane miles of streets designated on the City's bike map as bike routes that that do not have marked or separate bicycle facilities, or the lane widths are inadequate for bicycle travel.

The streets in South Lake Union that are designated on the bike map are Dexter Avenue North and Eastlake Avenue East. Dexter is striped for bicycles, and Eastlake's lanes are wide enough that it's a comfortable ride for cyclists without striping.

Based on this information, it could be concluded that there is no existing deficiency for bicycles. The conservative position adopted by this study is to assume a deficiency of 25%.

Pedestrian Deficiencies

Existing deficiencies in pedestrian facilities are determined by the percentage of linear distance of streets that have no sidewalks, or the sidewalks are dilapidated.

There are 106,700 lineal feet of streets in the South Lake Union area. A total of 4,200 lineal feet do not have sidewalks, or existing sidewalks are in poor condition. The deficient lineal footage is 3.9% of the total, therefore for the purpose of this mitigation program, 3.9% of the cost of all improvement projects for the pedestrian mode will be allocated to existing deficiencies (which cannot be paid by mitigation), and the remaining 96.1% of costs will be allocated to growth.

Transit Signal Priority Deficiencies

Existing deficiencies in traffic signal priorities for transit are determined by the percent of p.m. peak hour transit arrivals that are late.

The proposed transit signal priority projects are on Fairview Avenue North, therefore the transit departure analysis was performed on Route 70, one of several transit routes that travels on Fairview.

On-time, early, and late data was collected at the Fairview Avenue N/Denny Way bus stop and the Eastlake Ave E/Harvard Ave E bus stop during the weekdays in the fall of 2003 and early 2004.

The analysis summarized in Appendix B shows during the p.m. peak hour 20.8% of the busses on Route 70 arrived late at the Fairview/Denny bus stop. When those busses arrived at the Eastlake/Harvard bus stop, the late arrival rate increased to 31.4%, an increase of 10.6% more late arrivals between Fairview/Denny and Eastlake/Harvard.

It could be argued that the 20.8% delay occurred before the busses entered the South Lake Union area, and that only the increased delay of 10.6% is attributable to deficiencies in the South Lake Union area.

We have taken the more conservative position that the total delay of 31.4% is what riders experience in South Lake Union, therefore for the purpose of this mitigation program, 31.4% of the cost of all improvement projects for transit signal priority will be allocated to existing deficiencies (which cannot be paid by mitigation), and the remaining 68.6% of costs will be allocated to growth.

Transit Fixed Guideway Deficiencies

Existing deficiencies in transit fixed guideway (streetcar and trolley bus) are determined by transit load factors on routes serving South Lake Union. The premise is that if existing routes are over capacity, that constitutes an existing deficiency that should be attributed to fixed guideway transit because the streetcar and trolley are likely to serve the same passenger population.

We analyzed Route 17 which travels on Westlake Avenue, and Route 28 Local that travels on Dexter Avenue because these routes seem proximate to the proposed streetcar alignment.

The average load factors during the p.m. peak hour are less than 70%, therefore there is no overcrowding that would indicate an existing deficiency. As a result, for the purpose of this mitigation program, none of the cost of transit fixed guideway projects will be allocated to existing deficiencies (which cannot be paid by mitigation), and all 100% of costs will be allocated to growth.

Transit Shelters Deficiencies

Existing deficiencies in transit shelters are determined by identifying existing bus stops that do not have a transit shelter, but which have more than 50 riders boarding each day.

King County Metro established and uses the standard that a bus shelter is needed at locations with 50 or more boarding riders per day.

The analysis summarized in Appendix C lists four locations in the South Lake Union area that do not have a transit shelter, but which have more than 50 riders boarding each day. These locations are considered existing deficiencies.

The South Lake Union Transportation Study project list proposes to install nine transit shelters. Four of the nine shelters (44.4%) are deficiencies, therefore for the purpose of this mitigation program, 44.4% of the cost of all improvement projects for transit shelters will be allocated to existing deficiencies (which cannot be paid by mitigation), and the remaining 55.6% of costs will be allocated to growth.

TABLES 1-4: GROWTH'S SHARE OF TRANSPORTATION IMPROVEMENT COSTS

The information described above is summarized in four tables that list 26 transportation improvement projects that were determined to be eligible for the mitigation program, and the allocation of project costs between existing deficiencies and growth. In each table, the deficiency cost is calculated by multiplying the percentages described above times the total cost of each project. The cost of the deficiency is subtracted from the total cost and the difference is the cost attributable to growth.

Table 1 lists the projects, total cost, deficiency percentage, deficiency cost and growth cost for the auto traffic mode of transportation improvements.

Table 2 lists the projects, total cost, deficiency percentage, deficiency

cost and growth cost for the bicycle mode of transportation improvements.

Table 3 lists the projects, total cost, deficiency percentage, deficiency cost and growth cost for the pedestrian mode of transportation improvements.

Table 4 lists the projects, total cost, deficiency percentage, deficiency cost and growth cost for the transit mode of transportation improvements. The transit mode includes three categories of projects: transit signal priorities for transit, fixed guideway projects (i.e., streetcar and trolley bus), and transit shelters.

Table 1 Growth's Share of Auto Traffic Capital Improvement Projects

AUTO TRAFFIC PROJECTS	TOTAL	DEFICIENCY PERCENT	DEFICIENCY COST	GROWTH COST
Two-Way Mercer/Narrow Valley Concept				
1. Construct 7-lane 2-way Mercer St. between Fairview and Dexter Ave	$ 47,900,000	77.0%	$ 36,883,000	$ 11,017,000
2. Construct 2-lane Valley St. w/ left turn lanes	20,300,000	77.0%	15,631,000	4,669,000
3. Signal at Dexter Avenue and Republican Street	250,000	14.0%	35,000	215,000
Mercer/Fairview/I-5 Ramps				
4. Widen roadway (NB right-turn) and improve signage on NB Fairview Ave approach to I-5 on ramps	430,000	14.0%	60,200	369,800
Harrison East of Aurora				
5. 3-lane Thomas St from Fairview to 5th Ave (includes left turn lanes)	750,000	14.0%	105,000	645,000
Two-way traffic on 9th and Westlake				
6. Two-way Westlake Ave (4-5 lanes) and 9th Ave (3-lanes) from Aloha St to Denny	835,000	14.0%	116,900	718,100
Eastlake Avenue				
7. Add U-turn or center turn lane to allow SB left-turn from Eastlake to NB I-5 express lanes S of Denny	250,000	14.0%	35,000	215,000
8. Signal at Eastlake and Thomas	250,000	14.0%	35,000	215,000
9. Signal at Eastlake and Republican	250,000	14.0%	35,000	215,000
TOTAL	71,215,000		52,936,100	18,278,900

Table 2 Growth's Share of Bicycle Capital Improvement Projects

BICYCLE PROJECTS	TOTAL	DEFICIENCY PERCENT	DEFICIENCY COST	GROWTH COST
Improve Around-the-Lake Bike Facilities				
10. Include bike lanes on Fairview between Eastlake Ave and Valley St	$ 275,000	25.0%	$ 68,750	$ 206,250
11. Modify intersection for bike/ped access Fairview and Fairview (near Eastlake)	1,200,000	25.0%	300,000	900,000
Bike Routes				
12. Sign Lakeview Across I-5	1,000	25.0%	250	750
13. Sign bike route on Eastlake Avenue E (E Garfield to Denny) for bicycle commuters	2,000	25.0%	500	1,500
14. Sign bike routes "Commonly used" streets per SDOT Bicycle Guide Map	6,000	25.0%	1,500	4,500
Maintain/Improve Dexter as a north/south bicycle corridor				
15. Sign bike route: Dexter bike lanes to 2nd Avenue bike lanes & CCCR proposed bike lanes on 4th Avenue (via Blanchard & Bell)	2,000	25.0%	500	1,500
TOTAL	1,486,000		371,500	1,114,500

Table 3 Growth's Share of Pedestrian Capital Improvement Projects

PEDESTRIAN PROJECTS	TOTAL	DEFICIENCY PERCENT	DEFICIENCY COST	GROWTH COST
Cascade Neighborhood Pedestrian Improvements				
16. Up to 16 stop signs at uncontrolled intersections on Thomas and Harrison between Fairview and Eastlake	$ 8,000	3.9%	$ 312	$ 7,688
17. Widen sidewalks on Harrison, Minor & Pontius around Cascade Park	140,000	3.9%	5,460	135,540
Improve Denny Way Pedestrian Environment & I-5 Crossing				
18. Add 10' sidewalk to north side and 5' bike lane on the south side of Denny Way I-5 crossing	2,750,000	3.9%	107,250	2,642,750
19. Add curb bulb-outs and countdown signals a five Denny Way Intersections	580,000	3.9%	22,620	557,380
TOTAL	3,478,000		135,642	3,342,358

Table 4 Growth's Share of Transit Capital Improvement Projects

TRANSIT PROJECTS	TOTAL	DEFICIENCY PERCENT	DEFICIENCY COST	GROWTH COST
Create transit emphasis/transit priority street on Fairview Ave N				
20. On Fairview Avenue, add NB & SB Transit Signal Priority at Denny Way	$ 110,000	31.4%	$ 34,540	$ 75,460
21. Add NB que jump and SB Transit Signal Priority on Fairview at Harrison Street	110,000	31.4%	34,540	75,460
22. Transit signal priority on Fairview Avenue NB and SB at Mercer Street	110,000	31.4%	34,540	75,460
23. Add NB & SB Transit Signal Priority on Fairview Avenue at Valley Street	110,000	31.4%	34,540	75,460
TOTAL TRANSIT SIGNAL PRIORITIES	440,000		138,160	301,840
Construct proposed SLU Streetcar & Trolley Route				
24. Construct Streetcar on Westlake/Valley/Terry Westlake Center to FHCRC	45,000,000	0.0%	0	45,000,000
25. New route (trolley or other electric) from Uptown to N. Capitol Hill via Mercer or Republican	11,700,000	0.0%	0	11,700,000
TOTAL TRANSIT STREETCAR AND TROLLEY	56,700,000		0	56,700,000
Install transit bus shelters along bus routes in study area				
26. Install 9 transit bus shelters include appropriate lighting at shelters	235,000	44.4%	104,340	130,660
TOTAL TRANSIT SHELTERS	235,000		104,340	130,660

2. ACCOUNTING FOR OTHER FUNDING SOURCES.

The pilot mitigation program for South Lake Union identifies funding that the City has for the deficiency portions of the cost of the capital improvement projects, and any other funding in order to calculate the net growth cost.

Paying for Deficiency Costs

The deficiency costs listed in Tables 1 – 4 total $53.7 million. These costs cannot be charged to growth. The City must use other sources of revenue to pay for existing deficiencies.

The City's funding for the deficiency will come from City funds via the Capital Improvement Program, and grants and other appropriations from other governments. These revenues will be sufficient for the City to pay for the $53.7 million deficiency cost shown in Tables 1 – 4 without using mitigation fees to pay for any existing deficiency.

Other Funding for Specific Projects

At this time, the only funding identified for specific projects is $42.5 million for the streetcar. The money will come from a Local Improvement District (LID) comprising the properties along the streetcar route and grants. Properties in the LID will pay a special assessment proportional to the benefit their property receives from adjacency to the streetcar route, and the passengers who will use the streetcar.

Most of the other money the City regularly receives and uses for new and improved transportation is needed to pay for existing deficiencies, and has not been designated to reduce the cost of transportation improvements needed to serve growth.

TABLE 5: TOTAL COST, DEFICIENCY COST, TOTAL GROWTH COST, OTHER FUNDING, NET GROWTH COST

The first three lines of Table 5 list the total costs, deficiency costs, and total growth costs from Tables 1 – 4.

The fourth line of Table 5, "Adjustment for Other Financing" lists the

amount of funding that is available for each mode (described above in "Other Funding for Specific Projects". This amount is subtracted from the "Total Growth Cost" on line 3, and the result is the "Net Growth Cost" on the fifth line of Table 5.

Table 5 Growth's Proportionate Share of Capital Improvement Projects

TRAVEL MODE	TRAFFIC	BIKE	PED	TRANSIT SIGNAL PRIORITY	TRANSIT GUIDEWAY	TRANSIT SHELTERS	TOTAL
1. Total Cost	$71,215,000	$1,486,000	$3,478,000	$440,000	$56,700,000	$235,000	$133,554,000
2. Deficiency Cost	52,936,100	371,500	135,642	138,160	0	104,340	53,685,742
3. Total Growth Cost	18,278,900	1,114,500	3,342,358	301,840	56,700,000	130,660	79,868,258
4. Adjustment for Other Financing	0	0	0	0	-42,500,000	0	-42,500,000
5. Net Growth Cost	18,278,900	1,114,500	3,342,358	301,840	14,200,000	130,660	37,368,258
6. Traffic Originating in or Destined to SLU	23.2%	46.7%	60.5%	12.3%	50.2%	100.0%	37.7%
7. Cost of Projects Serving Growth in SLU	4,238.004	520,472	2,020,983	37,126	7,128,400	130,660	14,075,645
8. Growth Trips	9,210	388	2,537	250	250	250	12,885
9. Cost per Growth Trip							1,092

3. IDENTIFICATION OF TRAVEL THAT ORIGINATES IN, OR IS DESTINED TO SOUTH LAKE UNION.

Trips that originate in, and/or are destined to, a location within South Lake Union can participate in the mitigation program because the development that originates or serves as a destination occurs in South Lake Union. These trips will be considered "local" trips. All other trips in South Lake Union are "through trips" that travel through the area without stopping.

The pilot mitigation program for South Lake Union analyzes travel data to identify trips with local origins and/or destinations The local trip data is used to determine the portion of the net growth cost that can be mitigated by growth in South Lake Union. Specifically, for each mode of travel the local trips for each are divided by the total trips for that mode to determine the local percentage. The local percentage is then multiplied times the net growth cost to calculate the cost of the projects that serve growth in South Lake Union, and therefore are the basis for the mitigation fees.

Identification and quantification of local trips varies according to the mode of travel.

TRAFFIC LOCAL TRIPS

The tool used for this analysis is a "selected link" computer model assignment that finds the origins and destination of the trips that use a particular link by tracing their trips through the model. The City of Seattle's travel demand forecast model was used to analyze proposed roadway improvements in the South Lake Union mitigation program.

There are two variables that must be defined in order to conduct the selected link analysis: (1) the transportation facility, and (2) the areas serving as origins and/or destinations.

1. Transportation Facility

The list of the transportation improvements proposed by the South Lake Union Transportation Study was reviewed and six roadway improvements were identified that would likely affect roadway link capacity.

1. Roy Street from Westlake Ave to Dexter Ave
2. Thomas Street from SR 99 to Fairview Ave
3. Valley Street from Fairview Avenue to Westlake Avenue
4. Mercer Street from Dexter Avenue to Fairview Avenue
5. Westlake Avenue (two-way) from Aloha St to Denny Way
6. 9th Avenue (two-way) from Aloha St to Denny Way

The six roadway links were analyzed by "selected link assignment" runs using the City's model. The PM peak hour vehicle trip table in the Seattle Model was used to find the origins and destinations of the vehicles that use each of the proposed roadway improvements.

Appendix D contains eight tables showing the results of the selected link analyses. Table D-1 summarizes the results of the selected link analysis, including the percentage of trips that originate and/or are destined to locations in South Lake Union. Table D-2 presents the aggregated data from Tables D-3 – D-8, which contain the origins and destinations trip table for each of the six selected projects listed above.

2. Origin and Destination Areas

The origin and destination areas were defined according to their proximity to South Lake Union. Four proximity ranges were identified: local, adjacent, proximate, and remote.

The "local" area includes the Traffic Analysis Zones in the South Lake Union pilot area.

The model's Traffic Analysis Zones were aggregated to represent seven "adjacent" neighborhoods:

- Uptown/Queen Anne
- Eastlake
- Capital Hill
- Interbay
- Seattle CBD
- Fremont
- University District

The two "proximate" zones are North Seattle, and South/Central/West Seattle, which includes the areas south of Downtown and Capital Hill.

The "remote" areas include all areas outside the City of Seattle.

The analysis summarized in Appendix D shows origins and destinations of the vehicle trips that would travel on the selected links during the PM peak hour in 2030. The total projected trips that would travel these segments of the streets in 2030 are 15,005 vehicles. The total trips represent 30,010 origins and destinations (trip ends), because each trip has two trip ends.

The data in Table D-1 in Appendix D shows that 35.8% of all trip ends on the selected links have origins and/or destinations in South Lake Union.

For the purpose of this mitigation program, 35.8% of the cost of all improvement projects for the traffic mode, except Mercer and Valley, will be allocated to South Lake Union, and the remaining 64.2% of costs will be allocated to through trips.

Because the Mercer/Valley projects are considered to be more regional in character, the data from the Mercer and Valley selected link analyses (Tables D-5 and D-6) were used separately to quantify the local trip costs of the Mercer/Valley improvements. The local trip ends for Mercer and Valley are only 21.1%, therefore 21.1% of Mercer/Valley costs are included in the mitigation program, and the remaining 78.9% of the costs are allocated to through trips.

Since the Mercer/Valley projects are over 95% of the project costs, the resulting weighted average of the local trip percentages is the 23.2% shown for the Traffic mode on line 6 in Table 5.

BICYCLE LOCAL TRIPS

Bicycle trips are typically shorter than motor vehicle trips, and longer than pedestrian trips. We assume that bicycle trips are twice as local as traffic trips, and half as local as pedestrian trips. Since pedestrian trips are 100% local (as described below), bicycle trips would be 50% local. Since traffic trips are 21.7% local, bicycle trips would be 43.4% local. We average the two percentages and use the result, 46.7%, to allocate bicycle trips for this study.

For the purpose of this mitigation program, 46.7% of the cost of all improvement projects for the bicycle mode will be allocated to South Lake Union, and the remaining 53.3% of costs will be allocated to through trips.

PEDESTRIAN LOCAL TRIPS

For the purpose of this analysis, a pedestrian trip is limited to the walking portion of any longer trip that involves any other mode of travel. Pedestrian trips are typically short trips. Relatively few pedestrian trips would originate in, or be destined to, a location outside South Lake Union. As a practical matter, it is assumed that 100% of pedestrian trips are local trips.

For the purpose of this mitigation program, 100% of the cost of most improvement projects for the pedestrian mode will be allocated to South Lake Union. One project, number 18, improving the Denny Way I-5 crossing, is considered to provide half of its benefits to the Denny Triangle and the other half to South Lake Union. As a result, 50% of the cost of project 18 will be considered local trips in South Lake Union.

Since the Denny Way I-5 crossing project is 79% of the pedestrian project costs, the resulting weighted average of the local trip percentages is the 60.5% shown for the Pedestrian mode on line 6 in Table 5.

TRANSIT SIGNAL PRIORITY LOCAL TRIPS

Local trips for transit signal priority are represented by transit riders boarding or disembarking in South Lake Union. Total trips are represented by the total of all riders who board and disembark the same route. The percentage of trips that are local is determined by dividing the local trips by the total trips.

Ridership information was analyzed for Route 70 because it uses Fairview Avenue during the PM peak period. During that time period there were 1,124 persons on buses on Route 70, 138 of whom got on or off within the South Lake Union area. Dividing the 138 local riders by the 1,124 total indicates that 12.3% of the riders were local trips.

For the purpose of this mitigation program, 12.3% of the cost of all improvement projects for transit signal priorities will be allocated to South Lake Union, and the remaining 87.7% of costs will be allocated to through trips.

TRANSIT GUIDEWAY LOCAL TRIPS

The potential routes of the proposed streetcar and trolley bus routes were analyzed. It is estimated that 50% of the streetcar traffic will be local, and 51% of the trolley bus route will be in South Lake Union. The weighted average of these percentages is the 50.2% for the Transit Guideway mode on line 6 of Table 5.

For the purpose of this mitigation program, 50.2% of the cost of all improvement projects for transit guideway projects will be allocated to South Lake Union, and the remaining 49.8% of costs will be allocated to through trips.

TRANSIT SHELTER LOCAL TRIPS

Transit shelters are the beginning or end of pedestrians trips that are linked to transit trips. As described above, 100% of pedestrian trips are assumed to be local trips, therefore 100% of transit shelter "trips" are also assumed to be local.

For the purpose of this mitigation program, 100% of the cost of all improvement projects for transit shelters will be allocated to South Lake Union, and none of the costs will be allocated to through trips.

TABLE 5: LOCAL TRAFFIC AND COST OF PROJECTS SERVING GROWTH IN SOUTH LAKE UNION

The sixth line of Table 5 lists the percentage of the travel in each mode that is "local" (i.e., the origin and/or destination is in South Lake Union).

The local trips percentage for each mode is multiplied times the "Net Growth Cost" on line 5, and the result is the "Cost of Projects Serving Growth in SLU" on the seventh line of Table 5.

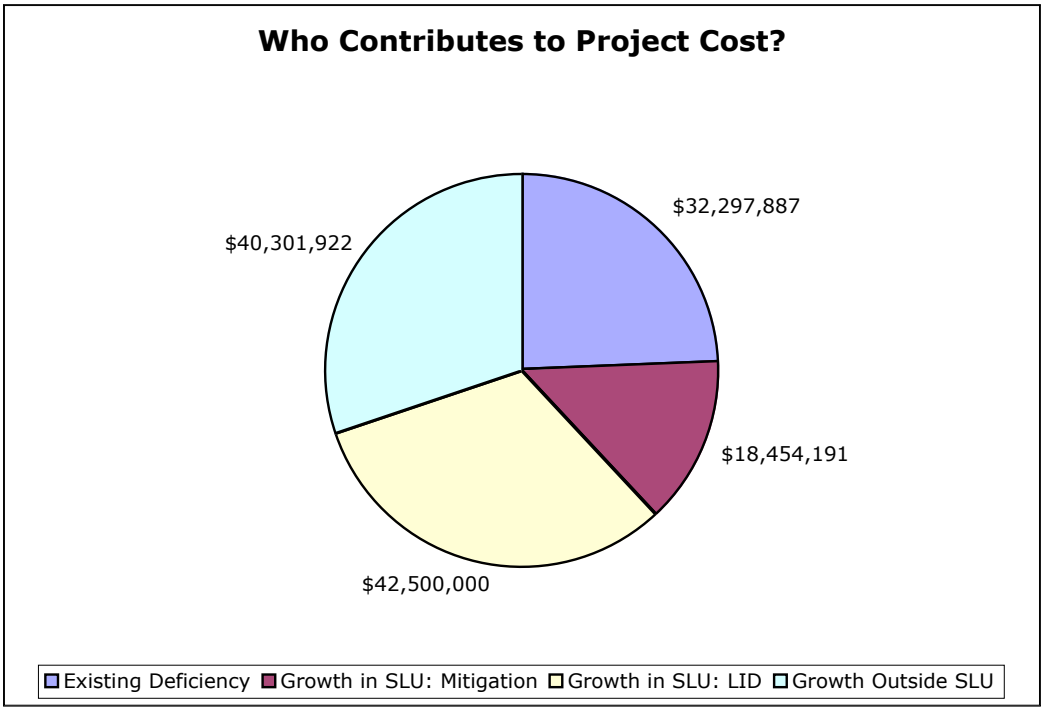
COST IMPLICATIONS OF THROUGH TRIPS

A through trip has the same impact on South Lake Union as a local trip, but each through trip comes from and goes to destinations that are not part of the South Lake Union mitigation program. The City is unable to obtain mitigation fees from those destinations because they are outside the area included in the mitigation program.

As a result, the cost of impacts of through trips are not paid by mitigation fees and become a "public share" to be paid by other sources, such as taxes, fees, and grants.

Figure 2 shows how the total cost of projects for the South Lake Union mitigation program are apportioned between existing deficiencies and growth. Note that the costs apportioned to mitigation and the LID are paid by private sources, and the costs of existing deficiencies and the cost of growth outside South Lake Union are paid by public sources.

Figure 2: Costs of Existing Deficiencies and Growth



4. QUANTIFICATION OF INCREASE IN TRIPS IN SOUTH LAKE UNION.

The increase in trips was estimated with the City's travel forecasting model. The model provided the daily person trip growth from 2000 to 2030 for the following travel modes:

- Single occupant driving
- Carpool
- Bicycle

- Walk (Pedestrian)
- Transit

Table E-1 in Appendix E shows the total daily person trips for 2000 and 2030, which are obtained from the City's model, and the trip growth between 2000 and 2030 calculated for each mode.

The total person trips in the South Lake union are forecast to increase by approximately 120 percent in the next 30 years. SOV and carpool travel is expected to increase 100 – 105%. Transit, walk and bicycle mode person trips are projected to increase 200 – 250% by 2030.

For the South Lake Union mitigation program the cost per trip is calculated based on the projected growth of the PM peak hour trips. It is necessary to apply a factor to estimate the PM peak hour trip growth. Table E-2 in Appendix E uses a PM peak hour factor[4] of 9.5 percent to calculate the PM peak hour person trips for 2000 and 2030 and the growth.

Finally, the trips in carpools need to be converted to vehicle trips because the mitigation for traffic is based on vehicular trips rather than person trips. To achieve this, the following assumptions are used:

- 70 percent of carpool vehicles carry two persons
- 30 percent of carpool vehicles carery three or more persons (with average vehicle occupancy of 3.15 person per vehicle).

Table E-3 in Appendix E shows the vehicle trips for 2000 and 2030 according to vehicle occupancy assumptions described above. The vehicle trips calculated for 2 occupant vehicles and 3 or more occupant vehicles are added to the trips for single occupant trips to determine the total vehicle trips.

The eighth line of Table 5 lists the increase in trips in each mode (i.e., growth trips).

5. CALCULATION OF THE COST PER TRIP.

The costs of projects serving growth in South Lake Union are summed in the Total column on the seventh line of Table 5. The growth trips on

[4] One hour out of 24 would be about 4% of the day, but the peak hour typically carries more than double the average, hence the peak hour factor of 9.5% of daily trips.

line 8 are also summed in the total column. The total cost of projects serving growth in South Lake Union is divided by the growth trips, and the resulting cost per growth trip is shown in the total column of the ninth line of Table 5.

6. QUANTIFICATION OF TRIP GENERATION RATES BY DIFFERENT TYPES OF DEVELOPMENT.

Trip generation rates for motor vehicles are readily available from Trip Generation by the Institute of Transportation Engineers (ITE)[5]. Trip generation data is not readily available for other modes of travel, therefore the following process was developed to obtain transit, pedestrian and bicycle person trip rates for the South Lake Union mitigation pilot project:

1. Estimate total daily person trips per land use category by developing expansion factors using the regional household activity survey conducted by the Puget Sound Regional Council in 1999.

2. Apply the expansion factors to the vehicle trip rates from the ITE Trip Generation report.

3. Apply transit, pedestrian and bicycle mode splits, obtained from the 1999 household activity survey for the North Seattle area (excluding Downtown Seattle), to the total daily person trip rates to obtain transit, pedestrian and bicycle trips per land use measuring unit.

Table 6 shows the results of this process. Trip rates are listed for each mode, and then summed to show the total trip rate for each land use category.

[5] The trip generation rates published by ITE are the largest compilation of such data, but there is some concern that the data represents more suburban travel characteristics than urban centers. Such trip generation rates may over-estimate car trips in urban areas where greater numbers of trips occur by transit, bike or pedestrian modes. The mode split in this study uses local data from PRSD that appropriately adjusts results for an accurate representation of expected SLU development.

Table 6 Trip Generation by Types of Land Use

LAND USE TYPE	ITE TRIP GEN CODE	UNIT OF MEASURE	VEHICLE TRIP RATE	BIKE TRIP RATE	PED TRIP RATE	TRANSIT TRIP RATE	TOTAL TRIP RATE
1. Commercial							
General Office Building	710	1,000 sq ft	1.340	0.061	0.199	0.185	1.785
Specialty Retail	814	1,000 sq ft	2.170	0.046	0.559	0.116	2.891
Shopping Center	610	1,000 sq ft	2.250	0.063	0.773	0.161	3.247
Restaurant	931	1,000 sq ft	7.490	0.170	2.716	0.189	10.565
Supermarket	850	1,000 sq ft	7.320	0.177	2.155	0.449	10.101
2. R&D, Business Startup							
Research & Development	760	1,000 sq ft	0.970	0.044	0.145	0.134	1.293
3. Light Industrial							
Warehousing	150	1,000 sq ft	0.420	0.019	0.063	0.058	0.560
General Light Industrial	110	1,000 sq ft	0.880	0.040	0.131	0.122	1.173
4. Residential							
Multiple Family	220	dwelling unit	0.590	0.022	0.135	0.106	0.853
5. Lodging							
Hotel	310	room	0.530	0.018	0.133	0.028	0.709
6. Medical							
Hospital	610	1,000 sq ft	1.000	0.012	0.068	0.130	1.210
Medical Office/Clinic	720	1,000 sq ft	3.160	0.153	4.980	0.463	8.756

7. CALCULATION OF MITIGATION FEE AMOUNTS FOR DIFFERENT TYPE OF DEVELOPMENT.

The final step in the pilot mitigation program for South Lake Union is to calculate the mitigation fee amounts for each land use category. Table 8 shows the results from multiplying the cost per growth trip from Table 5 times the total trip rate from Table 6.

Table 7 Mitigation Fees for Types of Land Use

LAND USE TYPE	ITE TRIP GEN CODE	UNIT OF MEASURE	FEE
1. Commercial			
General Office Building	710	sq ft	1.95
Specialty Retail	814	sq ft	3.16
Shopping Center	610	sq ft	3.55
Restaurant	931	sq ft	11.54
Supermarket	850	sq ft	11.03
2. R&D, Business Startup			
Research & Development	760	sq ft	1.41
3. Light Industrial			
Warehousing	150	sq ft	0.61
General Light Industrial	110	sq ft	1.28
4. Residential			
Multiple Family	220	dwelling unit	931.82
5. Lodging			
Hotel	310	room	774.52
6. Medical			
Hospital	610	sq ft	1.32
Medical Office/Clinic	720	sq ft	9.57

APPENDIX A – DEFICIENCY ANALYSIS DATA FOR TRAFFIC PROJECTS

Traffic deficiency is measured by the percentage of vehicle miles of travel that travels more slowly than the benchmark travel speed for key travel corridors. Nine corridors were analyzed to determine the actual travel speed compared to the benchmark travel speed for the type of street.

Travel Path	Speed	Urban Street Class	Bench-mark Speed	Existing Speed Minus Benchmark Speed	Vehicle Miles (volume times distance)	Weighted Vehicle Miles	Weighted Deficient Vehicle Miles	Percent Deficient
WB - I-5 to Northside Seattle Center	11.2 mph	III	10 mph	1.2	2,302	2,762		
EB - Northside Seattle Center to I-5	4.8 mph	III	10 mph	-5.2	1,611	8,377	8,377	
WB - I-5 to Southside Seattle Center	11.5 mph	III	10 mph	1.5	1,720	2,580		
EB - Southside Seattle Center to I-5	4.7 mph	III	10 mph	-5.3	1,706	9,042	9,042	
Total east-west routes							17,419	77%
SB - Fairview Ave	6.3 mph	IV	7 mph	-0.7	1,410	987	987	%
NB - Westlake Ave	12.0 mph	III	10 mph	5.0	930	4,650		
SB - 9th Ave	7.3 mph	IV	7 mph	0.3	412	124		
NB - Dexter Ave	11.7 mph	IV	7 mph	4.7	299	1,405		
SB - Dexter Ave	7.5 mph	IV	7 mph	0.5	286	143		
Total north-south routes						7,309	987	14%%

APPENDIX B – DEFICIENCY ANALYSIS DATA FOR TRANSIT SIGNAL PRIORITY PROJECTS

Deficiency is measured by the percent of transit runs that arrive late during the p.m. peak hour. The proposed transit signal priority projects in South Lake Union are on Fairview Avenue, therefore the transit analysis was performed on Route 70, one of several transit routes that travels on Fairview Avenue.

Block	Run	Route	Scheduled Time at Fairview & Denny	Average Off-Schedule at Fairview & Denny	Max Off-Schedule (earliest)	Min Off-Schedule (latest)	Standard Deviation Off-Schedule	Percent Early	Percent On-Time	Percent Late
Fairview Ave N. & Denny Way										
70	2	70	16:02	-3.61	3	-18	3.52	1.2%	76.2%	22.6%
70	3	70	16:16	-4.23	0	-10	2.36	0.0%	70.2%	29.8%
70	4	70	16:30	-2.26	2	-16	2.81	1.2%	92.9%	5.9%
70	9	70	16:43	-4.46	1	-18	3.36	0.0%	66.2%	33.8%
70	5	70	16:56	-2.83	3	-20	2.95	1.2%	86.7%	12.0%
Average				-3.48			3.00			20.8%
Eastlake and Harvard										
70	2	70		-4.28	5	-16	4.38	4.9%	64.6%	30.5%
70	3	70		-5.08	1	-13	3.27	0.0%	57.6%	42.4%
70	4	70		-2.06	5	-24	4.46	11.9%	75.0%	13.1%
70	9	70		-5.84	2	-19	4.03	2.7%	52.7%	44.6%
70	5	70		-4.37	2	-25	4.16	1.2%	72.3%	26.5%
Average				-4.33			4.06			31.4%

APPENDIX C – DEFICIENCY ANALYSIS DATA FOR TRANSIT SHELTERS

Metro's benchmark for needing a transit shelter is 50 or more passenger boardings per day. The following transit stops in South Lake Union exceed Metro's benchmark, but do not have a transit shelter. These sites are considered existing deficiencies that cannot be part of the mitigation program.

Route(s)	Direction	On Street	Cross Street	Daily Boardings
8	E	Denny Way	Fairview Ave	53
26, 28	S	Dexter Ave N	Aloha St	51
70, 71, 72, 73	S	Fairview Ave N	Harrison St	82
70, 71, 72, 73	S	Fairview Ave N	Mercer St	54

Two transit stops that exceed the threshold are currently in design, and will be completed before the mitigation program is started, therefore they are not considered existing deficiencies.

Route(s)	Direction	On Street	Cross Street	Daily Boardings
8	E	Denny Way	Stewart St	100
8	E	Denny Way	Dexter Ave	75

APPENDIX D – SELECTED LINK ANALYSIS OF LOCAL V. THROUGH TRAFFIC

The "selected link" analyses presented in this Appendix was prepared using Seattle's computer travel demand forecast model. The model traces trips through the street network to find the origin and destination of each trip that uses a particular link (road). This analysis finds the origins and destinations of trips on six proposed roadway improvements in the South Lake Union mitigation program.

Table D-1 summarizes the sources of all trip ends that use four proposed roadway improvements (excludin Mercer and Valley because of their regional character), and the percent that each source is of the total trip ends. There are four possible sources: local, adjacent, proximate, and remote, as described in "Origin and Destination Areas", page 23. The trip origins are from the "Total" column at the right side of Table D-2. The trip destinations are from the "Total" row at the bottom of Table D-2.

D-1. Percent of Trip Origins and Destinations by Source: Local, Adjacent, Proximate and Remote (Excluding Mercer and Valley)

Area	Origins	Destinations	Total Trip Ends	Percent of 30,010 Trip Ends
Local	5,882	4,891	10.743	35.8%
Adjacent	4,537	4,027	8,564	28.5%
Proximate	3,438	4,139	7,577	25.3%
Remote	1,178	1,948	3,126	10.4%

Table D-2 presents the aggregated data from the four detailed tables (D-3 – D-6). The "local" data is the South Lake Union origins and destinations. The "adjacent" data is the sum of the origins and destinations from seven areas that are near South Lake Union, including Uptown/Queen Anne, Eastlake, Capitol Hill, Interbay, Seattle Central Business

District, Fremont, and the University District. The "proximate" data is the total of North Seattle and South/Central/West Seattle origins and destinations. The "remote" data is the regional origins and destinations.

D-2. Aggregated Origins and Destinations of 2030 PM Peak Hour Trips on Four Selected Links

ORIGIN		Local	Adjacent	Proximate	Remote	Total
	Local	607	1,720	2,271	1,254	5,852
	Adjacent	2,188	1,225	840	284	4,537
	Proximate	1,520	760	748	410	3,438
	Remote	576	322	280	0	1,178
	Total	4,891	4,027	4,139	1,948	15,005

Tables D-7 and D-8 (Valley and Mercer) were analyzed separately, but using the same method and format. The separate analysis is because these two facilities have a stronger regional role than the other four, and because they represent over 95% of the cost of the auto/traffic projects.

All six detailed tables (D-3 – D-8) contain the origins and destinations trip table for each of the eight selected projects. The data is presented for eleven specific areas: South Lake Union, seven areas nearest to South Lake Union ("adjacent"), two areas representing the rest of the City ("proximate") and all areas outside the City ("region")

D-3. Origins and Destinations of 2030 PM Peak Hour Trips on Roy Street from Westlake Ave to Dexter Ave

			DESTINATION											
			Local	Adjacent							Proximate		Remote	TOTAL
			South Lake Union	Uptown/ Queen Anne	Eastlake	Capitol Hill	Interbay	Seattle CBD	Fremont	University District	North Seattle	South/ Central/ West Seattle	Region	TOTAL
ORIGIN	Local	South Lake Union	15	54	16	2	10	40	19	22	162	100	80	520
	Adjacent	Uptown/Queen Anne	67	0	46	0	0	0	0	52	11	27	0	203
		Eastlake	16	19	0	0	3	25	0	0	0	35	12	110
		Capitol Hill	0	0	0	0	0	0	1	0	2	2	0	5
		Interbay	14	0	10	1	0	0	0	0	0	3	0	28
		Seattle CBD	87	0	45	0	0	0	1	41	7	41	0	222
		Fremont	8	0	0	2	0	1	0	0	0	1	0	12
		University District	34	12	0	0	0	38	0	0	0	8	18	110
	Proximate	North Seattle	54	2	0	4	0	9	0	0	0	1	0	70
		South/Central/ West Seattle	104	27	47	3	4	22	8	5	23	77	21	341
	Remote	Region	44	5	14	0	2	3	6	3	15	36	0	128
TOTAL			443	119	178	12	19	138	35	123	220	331	131	1,749

D-4. Origins and Destinations of 2030 PM Peak Hour Trips on Thomas St. from SR 99 to Fairview Ave

			DESTINATION											
			Local	Adjacent							Proximate		Remote	TOTAL
			South Lake Union	Uptown/ Queen Anne	Eastlake	Capitol Hill	Interbay	Seattle CBD	Fremont	University District	North Seattle	South/ Central/ West Seattle	Region	TOTAL
ORIGIN	Local	South Lake Union	162	98	7	31	13	120	11	15	108	223	194	982
	Adjacent	Uptown/Queen Anne	194	0	0	15	0	5	0	0	1	5	5	225
		Eastlake	1	0	0	0	0	0	0	0	0	0	0	1
		Capitol Hill	16	6	0	0	2	3	3	0	8	10	0	48
		Interbay	33	0	0	4	0	0	0	0	0	3	0	40
		Seattle CBD	203	4	0	16	1	1	2	0	9	9	0	245
		Fremont	20	0	0	2	0	1	0	0	0	0	0	23
		University District	1	0	0	0	0	1	0	0	0	0	0	2
	Proximate	North Seattle	126	0	0	2	0	7	0	0	0	0	0	135
		South/Central/ West Seattle	177	5	0	12	4	3	10	0	24	31	3	269
	Remote	Region	52	0	0	0	0	6	0	0	0	0	0	58
TOTAL			985	113	7	82	20	147	26	15	150	281	202	2,028

D-5. Origins and Destinations of 2030 PM Peak Hour Trips on Westlake Avenue from Aloha St to Denny Way

			DESTINATION											
			Local	Adjacent							Proximate		Remote	TOTAL
			South Lake Union	Uptown/ Queen Anne	Eastlake	Capitol Hill	Interbay	Seattle CBD	Fremont	University District	North Seattle	South/ Central/ West Seattle	Region	TOTAL
ORIGIN	Local	South Lake Union	215	72	26	80	38	320	61	21	341	500	427	2,101
	Adjacent	Uptown/Queen Anne	86	0	3	24	0	7	0	0	0	11	0	131
		Eastlake	29	0	0	0	5	54	1	0	2	20	2	113
		Capitol Hill	71	14	0	0	12	12	18	0	45	44	0	216
		Interbay	47	0	4	17	0	6	0	0	0	22	45	141
		Seattle CBD	523	7	45	11	14	2	35	28	115	88	43	911
		Fremont	54	1	1	16	0	17	0	0	0	39	65	193
		University District	19	0	0	0	0	70	0	0	0	2	0	91
	Proximate	North Seattle	167	1	1	23	0	76	0	0	0	25	62	355
		South/Central/ West Seattle	413	4	18	54	26	70	61	1	145	208	219	1,219
	Remote	Region	214	0	1	0	14	117	35	0	54	72	0	507
TOTAL			1,838	99	99	225	109	751	211	50	702	1,031	863	5,978

D-6. Origins and Destinations of 2030 PM Peak Hour Trips on 9th Avenue from Aloha St to Denny Way

			DESTINATION											
			Local	Adjacent							Proximate		Remote	TOTAL
			South Lake Union	Uptown/ Queen Anne	Eastlake	Capitol Hill	Interbay	Seattle CBD	Fremont	University District	North Seattle	South/ Central/ West Seattle	Region	TOTAL
ORIGIN	Local	South Lake Union	123	64	26	37	13	285	17	52	200	372	447	1,636
	Adjacent	Uptown/Queen Anne	107	0	9	1	0	5	2	11	5	37	0	177
		Eastlake	22	3	0	0	0	8	0	0	0	6	9	48
		Capitol Hill	25	0	0	0	1	6	2	0	5	6	0	45
		Interbay	20	0	2	4	0	3	0	0	0	7	0	36
		Seattle CBD	242	1	1	3	1	2	5	1	10	53	0	319
		Fremont	13	0	0	5	0	3	0	0	0	1	0	22
		University District	50	4	0	0	0	16	0	0	0	8	18	96
	Proximate	North Seattle	72	2	0	8	0	15	0	0	0	0	0	97
		South/Central/ West Seattle	204	27	6	12	5	47	10	1	29	109	27	477
	Remote	Region	183	6	0	0	2	57	6	0	16	42	0	312
TOTAL			1,061	107	44	70	22	447	42	65	265	641	501	3,265

D-7. Origins and Destinations of 2030 PM Peak Hour Trips on Valley St. from Fairview Ave. to Westlake Ave

			DESTINATION											
			Local	Adjacent							Proximate		Remote	TOTAL
			South Lake Union	Uptown/ Queen Anne	Eastlake	Capitol Hill	Interbay	Seattle CBD	Fremont	University District	North Seattle	South/ Central/ West Seattle	Region	TOTAL
ORIGIN	Local	South Lake Union	92	6	45	9	10	15	26	39	162	103	106	613
	Adjacent	Uptown/Queen Anne	16	0	49	0	0	0	0	52	11	9	0	137
		Eastlake	49	19	0	0	8	31	0	0	1	54	14	176
		Capitol Hill	8	0	0	0	2	0	3	0	9	5	0	27
		Interbay	11	0	14	1	0	0	0	0	0	3	13	42
		Seattle CBD	22	0	54	0	0	0	1	44	11	9	0	141
		Fremont	21	0	1	1	0	0	0	0	0	11	22	56
		University District	59	12	0	0	0	47	0	0	0	9	18	145
	Proximate	North Seattle	110	2	1	2	0	15	0	0	0	5	20	155
		South/Central/ West Seattle	93	3	64	4	5	5	12	5	34	37	58	320
	Remote	Region	83	5	15	0	5	6	11	3	18	27	0	173
TOTAL			564	47	243	17	30	119	53	143	246	272	251	1,985

D-8. Origins and Destinations of 2030 PM Peak Hour Trips on Mercer St. from Dexter Ave. to Fairview Ave.

			DESTINATION											
			Local	Adjacent							Proximate		Remote	TOTAL
			South Lake Union	Uptown/ Queen Anne	Eastlake	Capitol Hill	Interbay	Seattle CBD	Fremont	University District	North Seattle	South/ Central/ West Seattle	Region	TOTAL
ORIGIN	Local	South Lake Union	36	156	21	9	45	13	42	57	454	396	717	1,946
	Adjacent	Uptown/Queen Anne	141	0	34	31	0	3	2	73	177	71	606	1,138
		Eastlake	12	40	0	0	11	63	0	0	1	43	6	176
		Capitol Hill	18	19	0	0	9	0	9	0	22	42	0	119
		Interbay	44	0	8	11	0	0	0	1	4	20	112	200
		Seattle CBD	26	3	48	3	2	0	6	54	111	39	315	607
		Fremont	6	1	0	2	0	2	0	0	0	18	43	72
		University District	31	27	0	0	1	84	0	0	0	4	0	147
	Proximate	North Seattle	112	35	0	3	2	68	0	0	0	19	43	282
		South/Central/ West Seattle	227	49	25	26	23	17	37	3	93	198	326	1,024
	Remote	Region	301	229	4	0	53	235	31	0	59	235	5	1,152
TOTAL			954	559	140	85	146	485	127	188	921	1,085	2,173	6,863

APPENDIX E – PROJECTED TRIP GROWTH IN SOUTH LAKE UNION

This appendix presents the data used to estimate growth in trips using Seattle's travel forecasting model. The growth in trips is used in calculating the cost per growth trip (by dividing the cost of improvements by the growth in trips).

The trip growth estimates are prepared in three steps. The data for each step is presented in a table below.

Table E-1 shows the total daily person trips for 2000 and 2030, which are obtained from the City's model, and the trip growth between 2000 and 2030 calculated for each mode.

E-1. Daily Person Trip Growth for Travel Modes from 2000 to 2030 in South Lake Union

Modes	Person Trips		2000 - 2030 Growth[6]	
	2000	2030	Person Trip Growth	Percent Growth
SOV	71,360	141,430	70,070	98.2
Carpool	58,140	118,490	60,350	103.8
Bike	1,820	5,900	4,080	224.2
Walk	11,050	37,760	26,710	241.7
Transit	4,330	12,220	7,890	182.2
Total	**146,700**	**315,800**	**169,100**	**115.3**

[6] Growth forecasts were obtained from the Puget Sound Regional Council's regional traffic model, and updated by the City of Seattle.

Table E-2 uses a PM peak hour factor of 9.5 percent to calculate the PM peak hour person trips for 2000 and 2030 and the growth.

E-2. PM Peak Hour Person Trip Growth for Travel Modes from 2000 to 2030 in South Lake Union

Modes	PM Peak Hour Person Trips		2000 - 2030 Growth	
	2000	2030	PM Peak Hour Person Trip Growth	Percent Growth
SOV	6,779	13,436	6,657	98.2
Carpool	5,523	11,257	5,773	103.8
Bike	173	561	388	224.2
Walk	1,050	3,587	2,537	241.7
Transit	411	1,161	750	182.2
Total	**13,937**	**30,001**	**16,065**	**115.3**

Table E-3 shows the vehicle trips for 2000 and 2030 assuming vehicle occupancy of two persons in 70% of carpools, and 3.15 persons in 30% of carpools. The vehicle trips calculated for 2 occupant vehicles and 3 or more occupant vehicles are added to the trips for single occupant trips to determine the total vehicle trips.

E-3. PM Peak Hour Vehicle Trip Growth from 2000 to 2030 in South Lake Union

Modes	PM Peak Hour Vehicle Trips		2000 - 2030 Growth	
	2000	2030	PM Peak Hour Vehicles	Percent
2 Occupant Vehicles	1,933	3,940	2,007	103.8
3 or More Occupant Vehicles	526	1,072	546	103.8
Single Occupant Vehicles	6,779	13,436	6,657	98.2
Total Vehicle Trips	**9,238**	**18,448**	**9,210**	**99.7**

APPENDIX F – MITIGATION FEE RATES IN CENTRAL PUGET SOUND

The following are lists of mitigation fee rates charged by other cities and by counties in the Central Puget Sound. Seattle's rates include all modes of travel (traffic, transit, bike and pedestrian), but all other governments' rates are only for traffic). Each table is listed in order from highest fee to lowest.

OFFICES

City or County	Zone	Office Cost per Square Foot
Snohomish County	Outside UGA - High	11.22
Snohomish County	Inside UGA - High	10.12
Snohomish County	Outside UGA - Low	6.48
Snohomish County	Inside UGA - Low	5.87
Redmond	High	4.63
Bothell		3.30
Kenmore		2.45
Olympia		2.00
Seattle (proposed)	South Lake Union	1.95
Bellevue	High	1.85
Kirkland		1.52
Newcastle		1.44
Redmond	Low	1.25
Bellevue	Low	1.22
Auburn		1.08

MULTI FAMILY HOUSING

City or County	Zone	Multi Family Cost per Dwelling Unit
Redmond	High	1,739
Snohomish County	Outside UGA - High	1,464
Kenmore		1,439
Snohomish County	Inside UGA - High	1,340
Bothell		1,271
Seattle (proposed)	South Lake Union	932
Snohomish County	Outside UGA - Low	847
Snohomish County	Inside UGA - Low	776
Olympia		768
Newcastle		600
Bellevue	High	590
Kirkland		586
Redmond	Low	469
Auburn		441
Bellevue	Low	324

SHOPPING CENTER

City or County	Zone	Shopping Center Cost per Square Foot
Snohomish County	Outside UGA - High	11.22
Snohomish County	Inside UGA - High	10.12
Snohomish County	Outside UGA - Low	6.48
Snohomish County	Inside UGA - Low	5.87
Redmond	High	4.63
Seattle (proposed)	South Lake Union	3.55
Bothell		3.30
Newcastle		2.59
Kenmore		2.45
Olympia		2.00
Bellevue	High	1.85
Kirkland		1.52
Redmond	Low	1.25
Bellevue	Low	1.22
Auburn		1.08